# T16D07 – (16.2) Reaction Mechanism Notes

Name ……………………………………………………..

1. 16.2.1 Explain that reactions can occur by more than one step and that the slowest step determines the rate of reaction (rate-determining step). (3)
2. 16.2.2 Describe the relationship between reaction mechanism, order of reaction and rate-determining step. (2)
   1. What can a study of the reaction mechanism support?
   2. What is an intermediate?
      1. Use NO2(g) + CO2(g) 🡪 NO(g) + CO2(g) as an example:
      2. Use 2HI(aq) + H2O2(aq) 🡪 I2(aq) + 2H2O(l) as an example:
   3. Molecularity is:
      1. Unimolecular:
      2. Bimolecular:
      3. Termolecular:
   4. What is the rate determining step?
      1. Use traffic as an example, draw a diagram:
      2. What is used to determine the rate law for a particular step? How is this different than the overall rate law that we have been calculating?

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| **Equation for rate-determining step** | **Molecularity** | **Rate Law** |
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* 1. How is the rate law calculated when the rate-determining step is the **first step**?

2NO2Cl(g) 🡪 2NO2(g) + Cl2(g)

* 1. How is the rate law calculated when the rate-determining step is **not the first step**?

2NO(g) + O2(g) 🡪 2NO2(g)

* 1. Give an explanation to support the rate expression of an overall zero order reaction:
  2. What is the transition state theory (TST)?
     1. Use the reaction of H2(g) + I2(g) 🡪 2HI(g) to explain using a diagram and labelling each part:
     2. The TST explains that product compounds can only be formed if:

* + 1. What two things must be known in order to calculate the reaction rates and transition states using

TST: